

REMARKS*Amendments to the Claims*

Claim 1 is amended to include the recitation that the oxidized product is readily detectable and quantified than the oxidized contaminants in the gas stream. Claim 25 has been amended to indicate that the oxidations conditions are such that the light hydrocarbons are not oxidized, if present in the gas stream. Claim 27 is amended to indicate that the oxidizable contaminant is also identified. The amendments to the claims contain no new matter.

Allowable Subject Matter

Pending claims 19 and 24 are allowable. The indication of allowability for Claims 17 and 18 is withdrawn.

Rejection under 35 U.S.C. §103(a) over Bies

Claims 1-6, 11-17, 20-22 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bies (U.S. Patent No. 2,364,940). The Examiner states that the concentration level of oxidizable contaminant is considered a result effective variable. The Examiner concludes that the discovery of an optimum value is within the ambit of a person of ordinary skill in the art. Applicants respectfully disagree with the Examiner's conclusion.

Detection and quantification of oxidizable contaminants to Applicants' levels are not trivial discoveries, as the Examiner indicates. Applicants have discovered a process for detecting oxidizable contaminants that are either undetectable or time consuming for real time analysis in a process stream for trouble shooting and correction of the contamination problem. The method is characterized as a chemical amplification of the concentration signal of the contaminants through proxy of its oxidative products. Applicant's process utilizes the stoichiometry of the oxidation products to determine the concentration and identity of oxidizable contaminants. Bies does not offer a detection system that even capable of stoichiometric evaluation of the oxidation products.

Bies is directed to using a high frequency current to induce oxidation of combustible gases from soil. As stated in the Office Action, "Bies teaches a methodology for the quantitative analysis of a gas sample comprising hydrocarbons in concentrations of approximately 20 part per million." Bies, however, provides no teaching, suggestion, or motivation that detection of

minute quantities of oxidizable contaminants may be amplified by analyzing the more readily detected and quantified products from oxidizing such contaminants. More particularly, Bies provides no teaching, suggestion, or motivation that levels of oxidizable contaminants less than 3000 ppt, below the real time detection limit for monitoring hydrocarbons at the filing of this application, may be detected and quantified by detecting the products from oxidizing such low levels of contaminants. In fact, the detection method of Bies measures the total partial pressure of water and carbon dioxide and thus is not capable of measuring to parts per trillion. Changes in pressure are not accurate measurements at the parts per trillion levels that Applicants detect because pressure changes are highly sensitive to temperature changes and even the smallest temperature fluctuation would impact sensitivity. Further, the Bies method does not result in stoichiometric values because there is no distinction provided in Bies between water and carbon dioxide as is necessary to determine the identity of the contaminants in the gas stream. Thus, one could not differentiate from among saturated, unsaturated and cyclic hydrocarbons.

To modify Bies to arrive at the teachings of amended Claim 1 constitutes nothing less than improper hindsight of the teaching of the application that more readily detectable oxidation products may be observed to identify and quantify less detectable oxidizable species.

With regard to independent Claim 17 and its dependent Claim 18, there is no teaching, suggestion or motivation in the Bies reference for selectively quantifying the concentration of certain oxidizable contaminants. See step (a) of Claim 17; less than all of the plurality of contaminants are completely oxidized, and Claim 18; controlling conditions to maintain temperature to achieve selective oxidation. The Bies method requires complete combustion of the entire sample and there is nothing taught in Bies how one could achieve selective oxidation. Therefore, the method of Claims 17 and 18 cannot be rendered obvious in view of Bies. It is respectfully noted that the Examiner did not set forth his reasons for rejection for these claims, while other claims were addressed.

Claim 21 is likewise directed to selectively quantifying the concentration of selected oxidizable contaminants, such as by controlling temperature (see dependent Claim 23). See page 5, paragraph [0013] of the specification for a discussion of individually oxidizing contaminants in a mixture of contaminants. For example, heavy hydrocarbons can be separated from light hydrocarbons. Bies does not teach, suggest or motivate one to selectively oxidize contaminants.

Claim 27 is directed to detecting, identifying and quantifying an oxidizable contaminant in a gas stream using the quantity of carbon dioxide and water. Bies does not teach, suggest or motivated how to obtain this information and use the information to determine the concentration and identity of an oxidizable contaminant.

For the reasons presented above, withdrawal and reconsideration of the rejection are respectfully requested as Bies fails to teach Applicants' claimed method at the low concentration levels set forth in the claims, fails to teach selectively quantifying a subset of contaminants in the gas stream, and further fails to teach an accurate detection means for stoichiometric determination of the oxidation products.

Rejection under 35 U.S.C. §103(a) over Bies and Oh et al.

Claims 7-10, 18, 23, 25 and 26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bies (U.S. Patent No. 2,364,940) and Oh *et al.* (U.S. Patent No. 5,736,104).

As discussed above, Bies provides no teaching, suggestion, or motivation that detection of minute quantities of oxidizable contaminants may be amplified by analyzing the more readily detected and quantified products from oxidizing such contaminants.

Oh is directed solely to the teaching of transition metal oxides to increase the rate of reaction of non-methane hydrocarbons. Oh is directed to detecting the heat of reaction to determine the presence of hydrocarbons, but this method is not capable of a stoichiometric determination of the oxidation products because heat dissipates so quickly and non-uniformly that precise measurements cannot be taken, as is required for Applicants' method at the detections levels claimed. As stated above for the Bies argument, heat is proportional to pressure change and thus is not an accurate measurement for quantifying the oxidation products at the levels that Applicants' set forth in the claims. As well, the only concentration limit of detection discussed by Oh is related to the hydrocarbon detection requirement of 100 ppm (see column 1, line 48). Oh provides no teaching, suggestion, or motivation of detecting the actual products of oxidation to arrive at the initial oxidizable contaminant concentration, or the ability to detect oxidizable contaminants below 3000 ppt. As such, Oh, alone or in combination with Bies, cannot render the claims obvious. Bies and Oh provide absolutely no teaching, suggestion, or motivation to detect an oxidizable contaminant at concentrations less than 3000 ppt by quantifying the oxidation product from the contaminants, such as set forth in Claim 7.

Claim 18 is directed to a method of selectively quantifying the concentration of oxidizable contaminants. As stated above, Bies neither teaches or suggests selective oxidation. The Oh reference also fails to teach how one would selectively oxidize a subset of contaminants, e.g., for the purpose of identifying specific contaminants in a process stream, at the levels that are set forth in the claim.

Claim 25 is directed to detecting and quantifying at least one heavy hydrocarbon in a contaminated gas stream. Neither Bies nor Oh teach, suggest or motivate Applicants' method for determining heavy hydrocarbons from light hydrocarbons. The conditions required for this selection are not described in either reference.

For the reasons presented above, withdrawal and reconsideration of the rejection are respectfully requested as the combination of Bies and Oh fails to teach Applicants' claimed method at the low concentration levels set forth in the claims, fails to teach selectively quantifying a subset of contaminants in the gas stream, and further fails to teach an accurate detection means for stoichiometric determination of the oxidation products.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By

Alice O. Carroll

Registration No. 33,542

Telephone: (978) 341-0036

Facsimile: (978) 341-0136

Concord, MA 01742-9133

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